

Effect Of Crossed Leg On Blood Pressure Reading Among Hypertensive Patient In Selected Hospital Haridwar District, Uttarakhand

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Abstract

Background of the study; Hypertension is increasing health problem in the most developing countries. It is also called as silent killer because it has not got warning signs. It is also called as high or increased blood pressure which is one of the global public health challenge. Hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated. **The aim of the study** was to assess the effect of cross leg on blood pressure reading **Methodology :** Pre experimental research design was used to achieve the aim of the study **Setting:** The study was conducted in Government District Hospital, Haridwar Uttarakhand. **Sample:** Purposive sampling technique was used to select the 60 hypertensive subject were include in the study. Data collection instruments used were used Sphygmomanometer, Stethoscope and Stop watch to collect the data. **Results:** Majority of the age group 28.3% patients belonged to 41-50 years and 51.7% patients was male. Most of the subjects are married 98.3%. 65% patients was Hindu; The majority of 53.3% patients were living in rural area. 76.7% patients were literate and 51.7% patients were working. 95% patients had previous information. The 95% patients were taking any antihypertensive drug daily. The study findings revealed that Crossed leg method had greater mean blood pressure than sitting position method while checking in morning and evening in hypertensive patients. **Conclusion :** The study concludes that both systolic and diastolic blood pressure rises when legs are crossed at knees. **Recommendation :** On the basis of the findings of the study, it is recommended that standard teaching text books should specify the position in which blood pressure needs to be taken. A special mention must be made on the position of the legs while measuring blood pressure. A similar study may be conducted on a larger population for generalization of findings.

Keywords : crossed leg on blood pressure reading among hypertensive patient

Introduction The higher the pressure in the blood vessels, the harder the heart must work, in order to pump blood, thus making the heart to work too hard. It is a severe medical state that significantly increase the risk of heart, brain, kidney and other diseases. It is also called "Silent Killer" because in the initial stage, it has not got specific sign and symptoms. What is the most effective approach to control hypertension in a certain population? Dietary and life style modifications and

management. And also hypertension awareness are the most effective ways to control hypertension.

Although much research work is done in this field, but there are certain gaps specially in lower and middle income countries as lack of awareness to general population and lack of access to implementable hypertension guidelines, and modifications in life style. (1)

This may be due to too much use of salt in their diet, which will be the main factor contributing in

increased blood pressure. Conversely, reduction in sodium intake not only decrease blood pressure levels and hypertension incidence, but is also associated with a reduction in cardiovascular morbidity and mortality. And also numerous factors are known to affect a person's blood pressure reading. The patient should, however, keep their feet flat on the ground, according to inconsistently stated guidelines for taking an accurate blood pressure reading. (2)

Studies suggest that there is lack of awareness and lack of understanding among caregivers in high blood pressure so that the basic focus should be on caregiver education on proper position in reading, dietary and life style changes, which can improve blood pressure and decrease the risk of associated health complications.

Aim of the study

The present study was aimed at assessing the effect of crossed legs on blood pressure reading among hypertensive patients

Significance of the study.

Current study helps in caregivers to provide accurate position while measuring Blood Pressure. This also helps in creating educational awareness and administrative protocols to implement to encourage proper measurement of Blood Pressure.

Objectives

1. To assess the blood pressure measurement in crossed leg among hypertensive patients in selected Hospital of Haridwar.
2. To assess the blood pressure measurement in sitting position among hypertensive patients in selected Hospital of Haridwar.
3. To compare the blood pressure measurement between crossed leg and sitting position.
4. To find out the association between crossed leg position blood pressure measurement with their selected demographic variables.
5. To find out the association between sitting position blood pressure measurement with their selected demographic variables.

Hypotheses

Ho-There is no significant relationship between crossed leg position and blood pressure reading.

Methodology

Research design: Pre experimental research design was utilized for conducting this study.

Research setting : The study was conducted in Government District Hospital, Haridwar Uttarakhand.

Research subjects: The sample size for the study is 60 hypertensive subjects in the selected area who were available at the time of data collection. The sample size is calculated using power analysis. Necessary data was retrieved from previous studies to calculate sample size.

Sampling technique : Purposive sampling technique were used in this study

Inclusion Criteria

- Hypertensive subject between the age group of 31 to 70 years, both male and female.
- Hypertensive subject who are on antihypertensive therapy

Exclusion Criteria

Subjects who are

- Hypertensive subjects who failed to take their medication on the day of blood pressure measurement.
- Noncompliance hypertensive subjects.
- Subjects who are in critical condition.
- Subjects who are not able to cross their legs.
- Pregnant women

Tool of data collection:

Sphygmomanometer and stethoscope

In 1881, the first sphygmomanometer was invented by Samuel Siegfried Karl Ritter von Basch. It is a device used to measure blood pressure, composed of an inflatable cuff to collapse and then release the artery under the cuff in a controlled manner and a mercury or aneroid manometer to measure the pressure. Manual sphygmomanometers are used with a stethoscope when using the auscultator technique.

Manual :-

Manual meters are best used by trained practitioners, and, while it is possible to obtain a basic reading through palpation alone, this yields only the systolic pressure. Mercury sphygmomanometers are considered the gold standard.

They indicate pressure with a column of mercury, which does not require recalibration. Because of their accuracy, they are often used in clinical trials of drugs and in clinical evaluations of high-risk patients, including pregnant women. A

frequently used wall mounted mercury sphygmomanometer is also known as a Baumann meter.

Stethoscope:-

The stethoscope is a medical device for auscultation, or listening to internal sounds of an animal or human body. It typically has a small disc-shaped resonator that is placed against the skin, with either one or two tubes connected to two earpieces.

A stethoscope can be used to listen to the sounds made by the heart, lungs or intestines, as well as blood flow in arteries and veins. In combination with a manual sphygmomanometer, it is commonly used when measuring blood pressure.

The diastolic reading, or the bottom number, is the pressure in the arteries when the heart rests between beats. This is the time when the heart fills with blood and gets oxygen.

Data Collection Tool

- Sphygmomanometer
- Stethoscope
- Stop watch

Validity

Validity refers to the degree to which an instrument measures what it is supposed to measure. To ensure validity of the tool, the blood pressure instrument was presented to an engineer for calibration. After the engineer provided us with a calibration certificate, the researcher proceeded with actual measurements of the study subject.

Reliability of tool

Reliability is the degree of consistency or accuracy with which an instrument measures the attribute which it designs to measure. Reliability of the blood pressure instrument was checked by taking a mean of two blood pressure reading for a individual. The reliability of the procedure was done by method using the checklist of the procedure of the blood pressure measurement.

Ethical consideration

The study was conducted after the approval of the Institutional Ethics Committee and Head of the Department, Shri Swami Bhuvanand College of Nursing, Haridwar, Uttarakhand.

Pilot study

Pilot study helped the investigator to assess the feasibility of the data collection plan, identify the inadequacies of the plan and make due modifications as required, find out the feasibility of conducting the study and to determine the of statistical analysis. The investigator selected SIX samples by non-probability convenient sampling

technique. After a brief self- introduction, the investigator explained the purpose of the study and obtained consent from them. The investigator analysed the data using descriptive and inferential statistics. The pilot study revealed that there was highly significant difference between the sitting crossed leg position and sitting uncrossed leg position.

Data Collection Method

The selected study subject was first interviewed using the inclusion and exclusion criteria. Once the study subject confirmed his participation in the study and signed the consent form he/she was made comfortable on a chair with his back rested on the chair with arm and back support. They were also instructed to wear loose clothes and not to exercise before their blood pressures were measured. Using a mercury-filled column sphygmomanometer, the blood pressure was measured in different positions such as sitting and sitting with crossed leg in hypertensive subjects. The height of the seat was adjusted so that the angle of the hip and knee joint was 90° Blood pressure was measured after holding in the respective position for 3 minutes. For measurement of the blood pressure in the crossed legs the subjects were instructed to cross the right leg in front of left leg at thigh level and relax.

Results: Data was computed and analysed using statistical package for the social science (SPSS-24). Data were presented using descriptive statistics in the form of frequencies and percentage, mean and standard deviation for quantitative variables. Chi square test was used to test the comparison of blood pressure reading with cross leg and without cross leg. Statistical significance was considered at P. value < 0.05.

Characteristics of demographic variables

Majority of the age group 28.3% patients belonged to 41-50 years & 51-60 years age group both; 26.7% patients belonged to 61-70 years and 16.7% patients belonged to 31-40 years age group. Majority of the 51.7% patients was male. Most of the subjects are married 98.3%. 65% patients was Hindu; 25% patients was Muslim; and 5% patients was Sikh & Christian. The majority of 53.3% patients were lived in rural area and 46.7% patients lived in urban area. The 76.7% patients were literate. The 51.7% patients were working. The majority of 95% patients had previous information. The 95% patients were taking any antihypertensive drug daily. The 70% patients were taking AMLODIPINE 5mg tablet and 30% patients were taking Telmisartan

40mg tablet. The majority of 55% patients had 1-10 years medication; 30% patients had less than 1 year medication; and 15% patients had more than 10 years medication. The 70% patients had physical activity and 30% patients had no physical activity. 68.3% patients took normal salt and 31.7% patients

took rock salt for daily intake. The majority of 53.3% patients had vegetarian diet and 46.7% patients had non vegetarian diet. The 51.7% patients had 51-70kg weight group; and 48.3% patients had 71-90 kg weight group in this study.

Section 1.1: To Compare The Blood Pressure Measurement Between Crossed Leg And Sitting Position.
Table 1.1: Comparison between Sitting position R1 and Crossed Leg R2 in Blood Pressure Reading among Hypertensive Patients at Morning in Selected Hospital N=60

Blood Pressure At Morning	Sitting R1	Crossed Leg R2	T Value	DF	P-Value	Result
Systolic	137.78 ± 14.418	149.50 ± 15.581	4.275	118	0.001	Significant
Diastolic	87.52 ± 11.011	89.97 ± 10.720	1.235	118	0.219	Insignificant
Mean Arterial Pressure	104.27 ± 10.726	109.81 ± 11.028	2.789	118	0.006	Significant

Table 1.1 shows that comparison between sitting position and crossed leg method in blood pressure at morning among hypertensive patients.

There was statistically significant difference between sitting position and crossed leg method at morning in systolic blood pressure with $P < 0.05$ and mean arterial pressure with $P < 0.05$ except not significant difference in diastolic blood pressure with $P > 0.05$. Crossed leg method had greater mean blood pressure than sitting position method while checking in morning in hypertensive patients.

Table 1.2: Comparison between Sitting position R1 and Crossed Leg R2 in Blood Pressure Reading among Hypertensive Patients at Evening in Selected Hospital N=60

Blood Pressure At Evening	Sitting R1	Crossed Leg R2	T Value	DF	P-Value	Result
Systolic	134.18 ± 11.629	145.87 ± 11.579	5.515	118	0.001	Significant
Diastolic	87.53 ± 8.262	89.67 ± 7.449	1.486	118	0.140	Insignificant
Mean Arterial Pressure	103.08 ± 8.312	108.40 ± 7.633	3.649	118	0.001	Significant

Table 1.2 shows that comparison between sitting position and crossed leg method in blood pressure at evening among hypertensive patients.

There was statistically significant difference between sitting position and crossed leg method at evening in systolic blood pressure with $P < 0.05$ and mean arterial pressure with $P < 0.05$ except not significant difference in diastolic blood pressure with $P > 0.05$. Crossed leg method had greater mean blood pressure than sitting position method while checking in evening in hypertensive patients.

Section 3: To find out the association between crossed leg position blood pressure measurement with their selected demographic variables.

Table 2: Association between crossed leg position blood pressure measurement at morning with their selected demographic variables in hypertensive patients

N=60

Demographical variables	Categories	Blood Pressure in Crossed Leg R2 at Morning				Chi square value	DF	P-value	Result
		Normal (n=4)	Pre hypertension (n=4)	Stage1 hypertension (n=11)	Stage2 hypertension (n=41)				
Age	31-40 years	2	1	0	7	10.586	9	0.305	Non significant
	%	50.0%	25.0%	0.0%	17.1%				
	41-50 years	1	1	2	13				
	%	25.0%	25.0%	18.2%	31.7%				
	51-60 years	0	1	3	13				
	%	0.0%	25.0%	27.3%	31.7%				
	61-70 years	1	1	6	8				
%	25.0%	25.0%	54.5%	19.5%					
Gender	Female	3	2	7	17	2.950	3	0.399	Non significant
	%	75.0%	50.0%	63.6%	41.5%				
	Male	1	2	4	24				
	%	25.0%	50.0%	36.4%	58.5%				
Marital status	Married	4	4	11	40	0.471	6	0.925	Non significant
	%	100.0%	100.0%	100.0%	97.6%				
	Unmarried	0	0	0	1				
	%	0.0%	0.0%	0.0%	2.4%				
	Divorcee	0	0	0	0				
%	0.0%	0.0%	0.0%	0.0%					
Religion	Christian	1	0	0	2	9.684	9	0.377	Non significant
	%	25.0%	0.0%	0.0%	4.9%				
	Hindu	2	3	7	27				
	%	50.0%	75.0%	63.6%	65.9%				
	Muslim	0	1	4	10				
	%	0.0%	25.0%	36.4%	24.4%				
	Sikh	1	0	0	2				
%	25.0%	0.0%	0.0%	4.9%					
Area of living	Rural	2	1	5	24	2.028	3	0.567	Non significant
	%	50.0%	25.0%	45.5%	58.5%				
	Urban	2	3	6	17				
	%	50.0%	75.0%	54.5%	41.5%				
Education	Illiterate	2	1	2	9	1.803	3	0.614	Non significant
	%	50.0%	25.0%	18.2%	22.0%				
	Literate	2	3	9	32				
	%	50.0%	75.0%	81.8%	78.0%				

Occupation	Non working	3	1	8	19	4.430	3	0.219	Non significant
	%	75.0%	25.0%	72.7%	46.3%				
	Working	1	3	3	22				
	%	25.0%	75.0%	27.3%	53.7%				
Previous information regarding hypertension	No	0	0	0	3	1.463	3	0.691	Non significant
	%	0.0%	0.0%	0.0%	7.3%				
	Yes	4	4	11	38				
	%	100.0%	100.0%	100.0%	92.7%				
Are you taking any antihypertensive drug daily	No	0	0	0	3	1.463	3	0.691	Non significant
	%	0.0%	0.0%	0.0%	7.3%				
	Yes	4	4	11	38				
	%	100.0%	100.0%	100.0%	92.7%				
If yes, specify the drug	Tab Amlodipine(5mg)	2	1	8	31	5.246	6	0.153	Non significant
	%	50.0%	25.0%	72.7%	75.6%				
	Tab Telmisartan(40mg)	2	3	3	10				
	%	50.0%	75.0%	27.3%	24.4%				
	Tab Telmisartan and Amlodipine (40mg+5mg)	0	0	0	0				
	%	0.0%	0.0%	0.0%	0.0%				
Duration of medication	1-10 years	2	1	8	22	4.969	6	0.548	Non significant
	%	50.0%	25.0%	72.7%	53.7%				
	Less than 1 year	2	2	1	13				
	%	50.0%	50.0%	9.1%	31.7%				
	More than 10 year	0	1	2	6				
	%	0.0%	25.0%	18.2%	14.6%				
Do you do any physical activity	No	0	0	3	15	4.314	3	0.229	Non significant
	%	0.0%	0.0%	27.3%	36.6%				
	Yes	4	4	8	26				
	%	100.0%	100.0%	72.7%	63.4%				
Which recommended salt for daily intake	Normal Salt	4	2	9	26	3.858	3	0.277	Non significant
	%	100.0%	50.0%	81.8%	63.4%				
	Rock Salt	0	2	2	15				
	%	0.0%	50.0%	18.2%	36.6%				
Which kind of diet	Non vegetarian	2	2	6	18	0.436	3	0.933	Non significant
	%	50.0%	50.0%	54.5%	43.9%				
	Vegetarian	2	2	5	23				
	%	50.0%	50.0%	45.5%	56.1%				
Weight	51-70 Kg	3	2	6	20	1.050	6	0.789	Non significant
	%	75.0%	50.0%	54.5%	48.8%				
	71-90 Kg	1	2	5	21				
	%	25.0%	50.0%	45.5%	51.2%				
	91-110 Kg	0	0	0	0				
	%	0.0%	0.0%	0.0%	0.0%				

Table 2 shows that association between crossed leg position blood pressure measurement at morning with their selected demographic variables in hypertensive patients.

There was no statistical association between crossed leg position blood pressure measurement at morning with demographical variables as Age, Gender, Marital status, Religion, Area of living, Education, Occupation, Previous information regarding hypertension, taking any antihypertensive drug daily, If yes, specify the drug, Duration of medication, any physical activity, Which salt recommended for daily intake, Which kind of diet, Weight with $P > 0.05$.

Discussion

The present study was conducted using digital sphygmomanometer; and each patient's blood pressure was measured a total of six times 2, testing two arm, while arms were at a right angle to the body on sitting with cross leg and without cross leg. In another similar study done by William C and Shiel W (2018) has similar findind that position will effect the BP reading , informed that; on measuring BP, the arm has to be on heart level, that while sitting and standing positions; the arm should be extended out straight and to be about 2-3 inches below the shoulder to approximate the level of the heart. He explained that; when arms hang down straight, the BP may be falsely diminished by as much as 12 mm Hg. below its true value.(14) Researches emphasized that; readings will not be affected meaningfully if the person is lying down, as long as the arm is kept alongside at the level of the body. (15,16) This was supported also by Muntner et al. (2019) who pointed that Mercury sphygmomanometer has been the traditional gold standard way for recording BP; despite the fact that mercury is being banned in many countries. It has been replaced with aneroid and oscillometric devices, both of which are being used with increasing frequency but have not been accepted as being as accurate as mercury. (16) The current study findings illustrated that; the mean right and left systolic blood pressure readings in supine position tended to be lesser than sitting and standing. Also; the mean right supine BP was lesser when compared to sitting position significantly.

Conclusion

The measured blood pressure of 60 sample were statistically compared in all the positions to find out if there was any change in blood pressure from that of sitting position. The study concluded that Blood pressure, both systolic and diastolic rises when legs are crossed at knees. The rise in blood pressure in significant when the legs are crossed at the knees. A significant population hypertensive had a change in their grades of blood pressure when the legs were crossed at knees. There is no association found

between demographic variables with blood pressure measured

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